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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/677,870 | 10/03/2000 | Woo Hyuk Choi | 2658-0240P | 6124 |

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| EXAMINER |
|---|
| RUDE, TIMOTHY L |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2871 | |

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/677,870 | CHOI ET AL. | |
| | Examiner | Art Unit | |
| | Timothy L Rude | 2871 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 February 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Drawings*

1. The corrected or substitute drawings were received on 21 February 2003. These drawings are accepted by the examiner.

### *Claims*

2. Claims 1, 2, and 4 are amended necessitating new grounds of rejection. Claims 8-18 are added.

### *Claim Rejections - 35 USC § 112*

3. Rejection of claim 4 under 35 U.S.C. 112, second paragraph, is withdrawn.

### *Claim Objections*

4. Claims 1, 4, 7-10, 13, 14, and 16-18 are objected to because of the following informalities:

As to claim 1, for examination purposes, the recitation "dummy pattern being integrated with the data line" will be interpreted as -- dummy pattern being integrated with the gate line -- (see Figure 6 of Paper No. 8).

As to claim 4, it is not clear how a recess can be connected to anything. The claim recitation "formed to permit a repair" is not clear whether the recess is formed as part of the repair activity or whether it is formed as part of the regular production to make any needed repairs easier to make. For examination purposes, the dummy pattern will be considered connected to the gate line, and the recess will be considered formed in the dummy pattern as part of regular production to make it easier to disconnect the dummy pattern from the gate line as part of any needed repair activity.

As to claim 7, the claim is not clear as to what is protruding. For examination purposes, the protrusion will be considered to be a protrusion of the data line (see Figure 7 of Paper No. 8).

As to claim 8, for examination purposes, the recitation "the gate dummy pattern is formed on the lower substrate having a gate-insulating layer at each side of the data line" will be interpreted as -- on the lower substrate having a gate-insulating layer, a gate dummy pattern exists at each side of the data line --.

As to claim 9, the term "braking" will be interpreted as -- breaking -- . The recitation "for braking the gate line and the gate dummy pattern" will be interpreted as -- for breaking the dummy pattern from the gate line --. Furthermore, the claim is not clear regarding what structure is not overlapped with the data line. For examination purposes, the recess will be considered to not overlap the data line.

As to claim 10, "applying a data signals" will be interpreted as -- applying a data signal --.

As to claim 13, it is not clear how a hole can be connected to anything. The claim recitation "formed to permit a repair" is not clear whether the hole is formed as part of the repair activity or whether it is formed as part of the regular production to make any needed repairs easier to make. For examination purposes, the dummy pattern will be considered connected to the gate line, and the hole will be considered formed in the dummy pattern as part of regular production to make it easier to disconnect the dummy pattern from the gate line as part of any needed repair activity.

As to claim 14, base claim 10 says the dummy pattern serves as a black matrix.

As to claim 16, there is no mention of a hole (or a recess) in claims 14 and 10.

As to claim 17, the recitation "the gate dummy pattern is formed on the lower substrate having a gate-insulating layer at each side of the data line" will be interpreted as -- on the lower substrate having a gate-insulating layer, a gate dummy pattern exists at each side of the data line --.

As to claim 18, there is no mention of a recess (or a hole) in claim 10. The term "braking" will be interpreted as -- breaking --. The recitation "for braking the gate line and the gate dummy pattern" will be interpreted as -- for breaking the dummy pattern from the gate line --. Furthermore, the claim is not clear regarding what structure is not overlapped with the data line. For examination purposes, a recess will be considered to not overlap the data line.

Appropriate corrections to claims 1, 4, 7-10, 13, 14, and 16-18 are required. The claims must particularly point out and distinctly claim the subject matter which applicant regards as the invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5, 6, 8, 10-12, 14, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (Kim) USPAT 6,429,909 B1 in view of Song et al (Song) USPAT 6,313,889 B1.

As to claims 1 and 2, Kim discloses in the third embodiment, Figures 6 and 7, (col. 6, line 35 through col. 7, line 5), a thin film transistor substrate in a liquid crystal display provided with a data line, 400, for applying a data signal, a gate line, 100, for applying a gate signal, and a transparent pixel electrode, 600, for driving a liquid crystal cell, said substrate comprising: repair lines, 110 and 120, (Applicant's gate dummy pattern) formed of the same material layer as the gate line (col. 6, lines 38-42 and col. 2, lines 10-17) so as to extended vertically from the gate line, 100, and to overlap the pixel electrode, 600, and data line 400, to compensate for misalignment occurring along the data line.

*FIG.6*

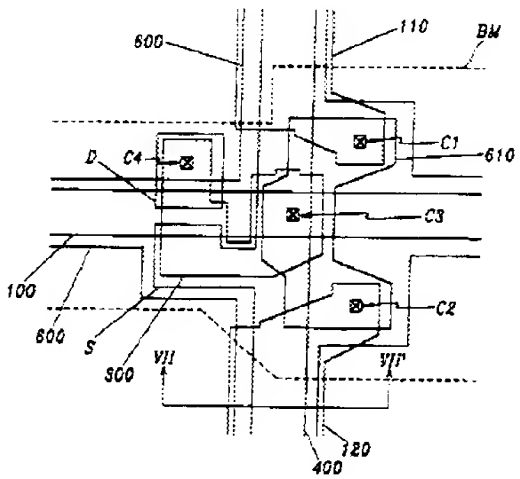
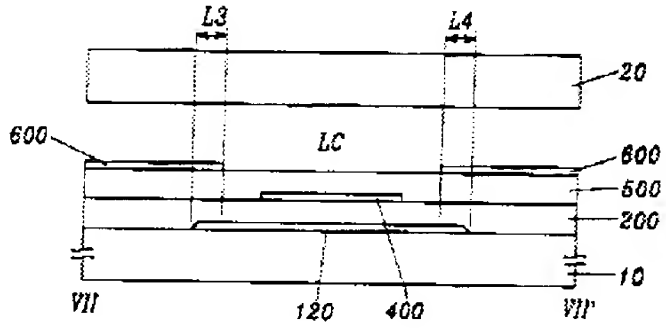


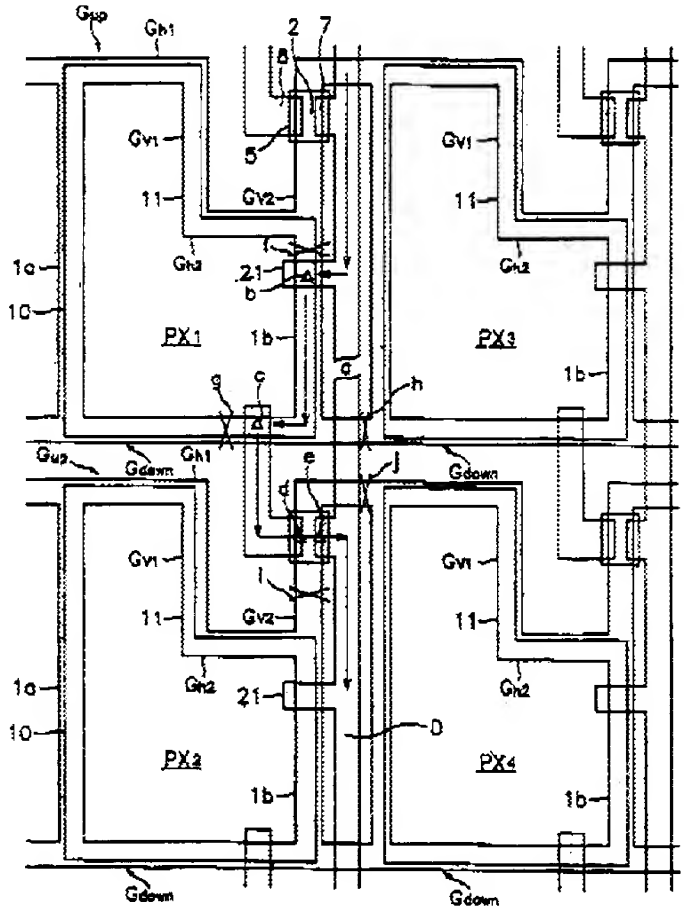
*FIG. 7*




Kim does not explicitly disclose a display wherein the gate dummy pattern is integrated with the data line.

Song teaches the use of a redundant pattern that is integrated with the gate line in Figure 19A ($G_{up}$ and $G_{down}$ or 1a and 1b) as a redundancy electrode for electrically connecting the gate line to the broken data line (col. 17, lines 4-67, especially col. 17, lines 47-54) to effect repairs.

FIG. 19A




Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as to serve as a redundancy electrode for electrically connecting the gate line to the broken data line to effect repairs.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the

redundancy electrodes for electrically connecting the gate line to the broken data line per Song.

As to claims 10, 11, and 14, Kim discloses repair lines, 110 and 120, (Applicant's gate dummy pattern) formed of the same material layer as the gate line (col. 6, lines 38-42 and col. 2, lines 10-17) so as to extended vertically from the gate line, 100, and to overlap the pixel electrode, 600, and data line 400, to compensate for misalignment occurring along the data line. Therefore the amount of overlap is an art-recognized results effective variable to compensate for misalignment occurring along the data line.

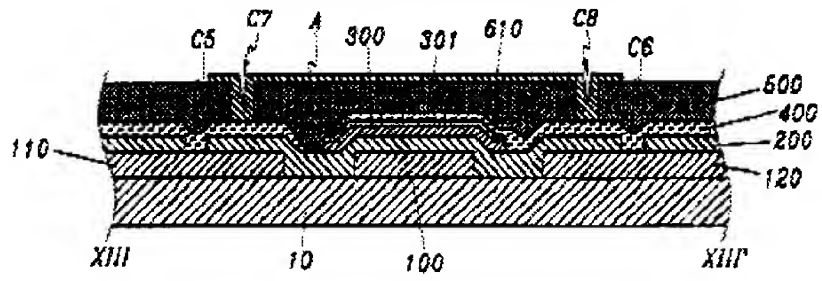
Therefore deriving the claimed range of 0.5-1 μm would take only ordinary skill in the art of liquid crystals to compensate for misalignment occurring along the data line (MPEP 2144.05 II).

As to claim 5, Kim discloses the use of repair lines, 110 and 120, (Applicant's gate dummy pattern) as a black matrix (col. 6, lines 48-59 and col. 1, line 66 through col. 2, line 2).

As to claims 3 and 12, Kim discloses the thin film transistor substrate according to claims 1 and 2.

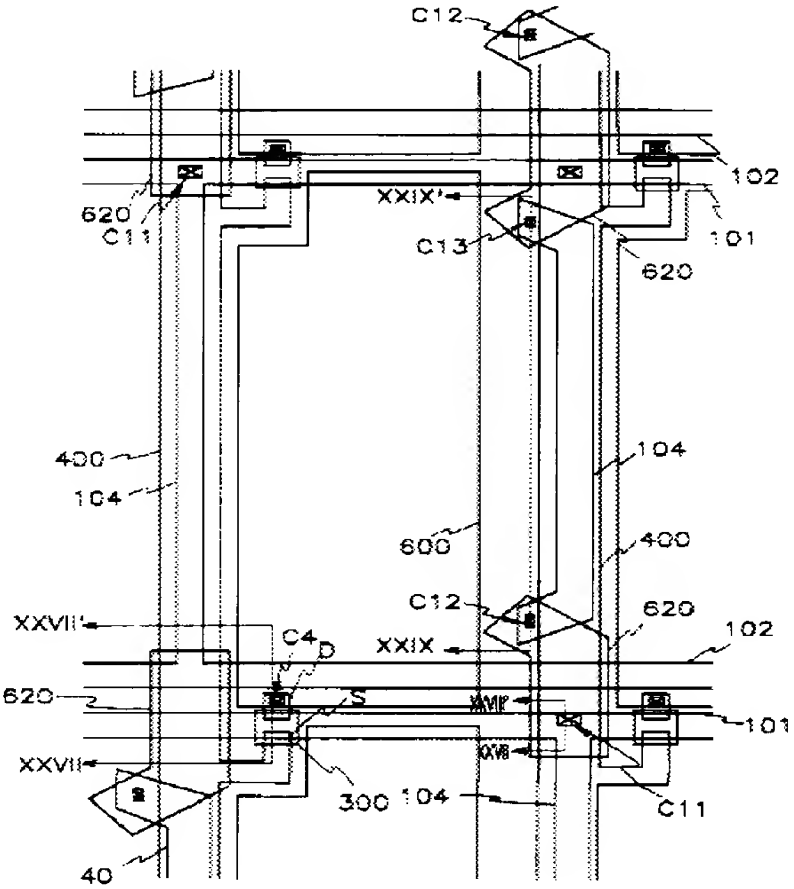
Kim teaches in Figure 13 the use of forming holes and connections to the repair lines, 110 and 120, (Applicant's gate dummy pattern) and to a connecting pattern, 610, to repair a broken data line, 400, (col. 8, lines 1-15).

*FIG. 13*




Kim teaches in Figure 26 the use of repair lines, 104, (Applicant's gate dummy pattern used as a redundancy electrode) to connect the gate line to the data line (col. 13, lines 4-17).

*FIG.26*



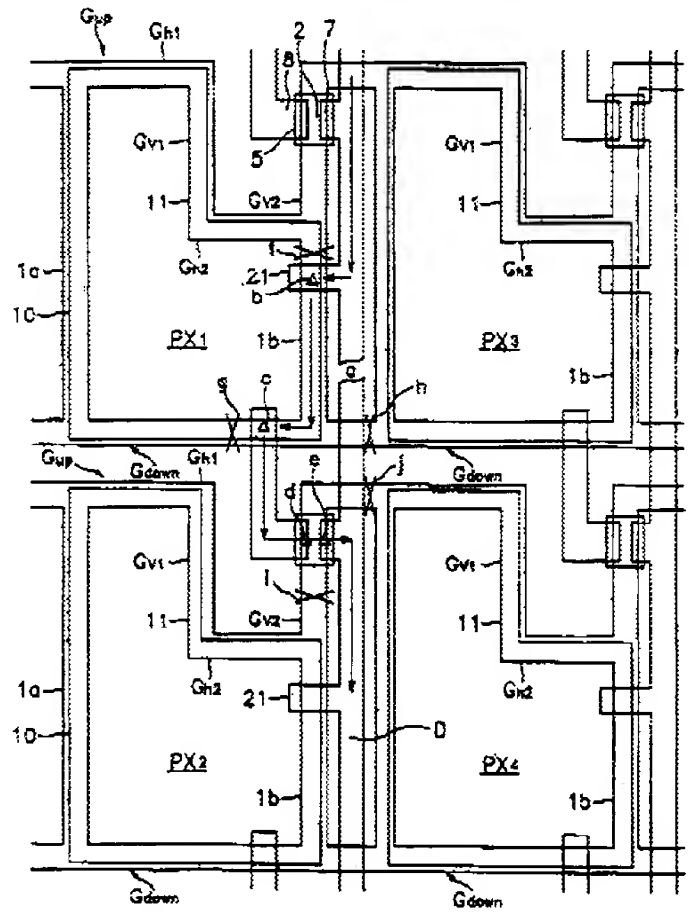

Kim is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form holes and connect gate dummy patterns to gate lines to repair a broken data line.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim by forming holes and connecting gate dummy patterns to gate lines to repair a broken data line.

As to claims 3 and 12, Kim discloses the thin film transistor substrate according to claims 1 and 2.

Song teaches the use of a redundant pattern in Figure 19A ($G_{up}$ and $G_{down}$ or 1a and 1b) as a redundancy electrode for electrically connecting the gate line to the broken data line (col. 17, lines 4-67, especially col. 17, lines 47-54) to effect repairs.

**FIG. 19A**



Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as to serve as a redundancy electrode for electrically connecting the gate line to the broken data line to effect repairs.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the redundancy electrodes for electrically connecting the gate line to the broken data line per Song.

As to claims 6 and 15, Song teaches in Figure 18 a thin film transistor substrate further comprising: a storage capacitor (col. 15, lines 56-64) defined by a horizontal overlapping part, $G_{h2}$, between the gate line and the pixel electrode, PX. Song also teaches in Figure 18 an analogous overlapping portion, 21, of the data line, D, to permit a repair.

Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as to form a capacitor and to include a hole connected to the gate line and formed to permit a repair.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the capacitor, dummy pattern, and hole per Song.

As to claims 8 and 17, mere duplication of parts is not patentably distinct unless unexpected results are obtained.

Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Song as applied to claims 1-7 and 10 above, and further in view of Cheng USPAT 5,657,101.

As to claims 8 and 17, Kim in view of Song discloses the display above.

Kim in view of Song does not explicitly disclose gate dummy patterns on both sides of the data line.

Cheng discloses patterns made from the gate metal layer (Applicant's gate dummy patterns) on both sides of the data line in Figure 5d (col. 4, lines 26-61) to improve the aperture ratio.

Cheng is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add gate dummy patterns on both sides of the data line to improve the aperture ratio.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim in view of Song with the gate dummy patterns on both sides of the data line of Cheng to improve the aperture ratio.

6. Claims 4, 7, 9, 13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Song as applied to claims 1-7 and 10 above, and further in view of Irie et al (Irie) USPAT 5,734,450.

As to claims 4, 9, 13, and 18, Kim in view of Song discloses the display above.

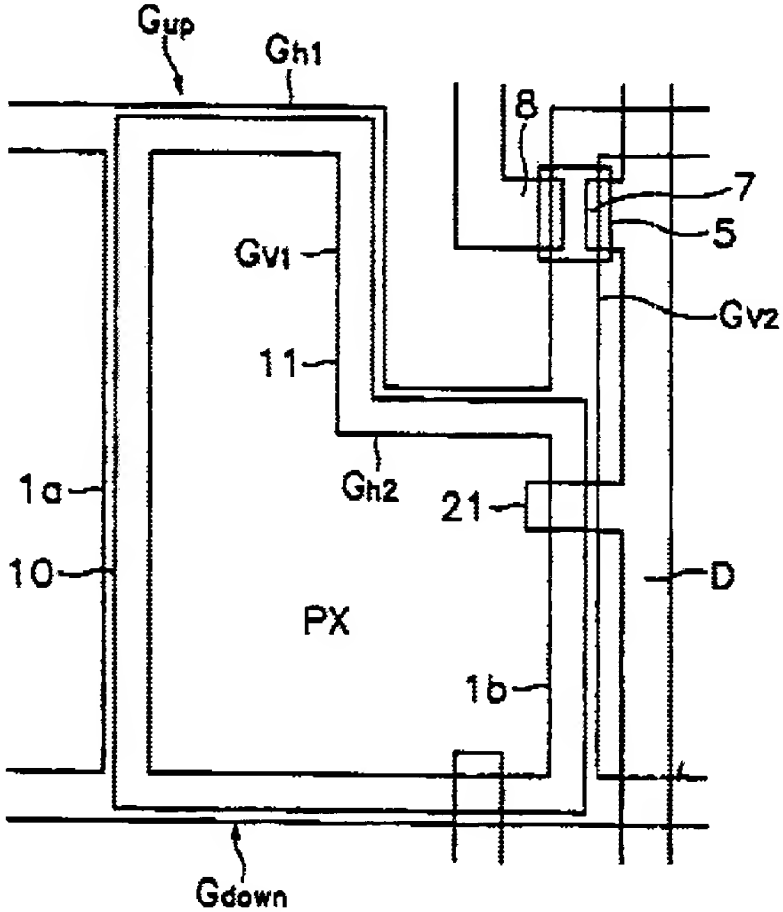
Kim in view of Song does not explicitly disclose a recess in the dummy pattern to make it easier to cut for purposes of repair.

Irie teaches as prior art that a structure branching off the gate line may be made narrow (Applicant's recess), and not overlapping the data line, to facilitate laser cutting (col. 2, lines 7-20) for purposes of repair (col. 2, lines 61-67) which allows for easy correction of point defects.

Irie is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a non-overlapping recess in the gate dummy pattern to facilitate laser cutting for purposes of repair, which allows for easy correction of point defects.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim in view of Song with the non-overlapping recess in the gate dummy pattern to facilitate laser cutting for purposes of repair, which allows for easy correction of point defects.

# FIG. 18




As to claims 7 and 16, Song teaches in Figures 18 and 19A a protrusion, 21, formed in the data line in such a manner to overlap with the intended repair site (Applicant's recess and narrowed portion of the gate dummy patterns), the structure of which would thereby shut off a light leaked between the gate dummy pattern and the gate line (col. 15, lines 42-63). Note that in considering the disclosure of a reference, it

is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom (MPEP 2144.01).

Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a protrusion in the data line, formed in such a manner to overlap with the area of the recess and narrowed portion of the gate dummy patterns, to permit a repair.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the protrusion of Song to permit a repair.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Timothy L Rude
Examiner
Art Unit 2871

TLR
June 18, 2003